WEST GOSHEN SEWER AUTHORITY
CHESTER COUNTY, PENNSYLVANIA

Status Report No. 3
July 6, 2015

Work Completed the Past 6 Months

1. Engineer and staff continued to review the plant operations and determined that the optimum location for a second application feed point was prior to the polishing clarifiers. A bench test was performed by the Authority's chemical supplier on March 23, 2015. The goal was to determine the best chemical to add to the polishing filters to achieve additional nutrient removal. The selected optimum chemical is similar to a Delpak/polymer mix and it was delivered on June 27, 2015. Plant staff will begin to use and experiment with the new chemical over the coming weeks and will continue to monitor for effectiveness.

2. Based on evaluations of the results of chemicals used to remove phosphorus, the Engineer and staff changed the phosphorus removal chemical for 2015 to one which is purported to optimize the removal of phosphorus while maintaining a higher pH in the wastewater. Due to the cold and wet weather in April and May the new chemical still had a tendency to lower the pH level in the wastewater which caused secondary effects on the overall treatment process. This required the addition of soda ash at times to raise the pH levels. Soda ash was added a week before and during the application of Delpak prior to the polishing filter, which preliminarily indicates this combination can achieve lower levels of phosphorus in the effluent. The Engineer and staff will continue to evaluate phosphorus removal chemicals to attempt to minimize other potential unintended consequences.

3. Authority personnel met with additional representatives of manufacturers of phosphorus removal and dewatering technology to evaluate the potential for using such technology in the plant. The manufacturers included:

    a. Siemens – ENR, Bardenpho process, membrane and disk technology
    b. Blue Water Technologies – ENR
    c. Kruger/Veolia – ENR, Bardenpho process, membrane and disk technology
    d. Infilco – ENR, Bardenpho process
    e. Westphalia – Centrifuge
    f. Alfa Laval – Centrifuge
    g. PW Tech – Volute Press
    h. Ashbrook – Belt Filter Press
    i. Pall Corporation – Membrane Technology

4. Authority staff and engineers implemented previously planned tests to determine the effect the filtrate in the biosolids dewatering presses had on phosphorus levels. The plant staff simulated the effect of not operating the belt filter presses by hauling off the

anaerobic sludge to another facility for a thirteen (13) day period in September 2014 and five (5) days in June 2015.

See attached table which shows effluent phosphorus results from September and early October, 2014 as well as June, 2015. Authority staff and engineers are still evaluating the import of this data and assessing the lessons learned from these tests.

5. The Authority staff set up a system on May 19, 2015 to pump the filtrate from the two belt presses into currently unused aerobic digester tanks to treat the side stream. The filtrate flow was considerably greater than anticipated and the tanks could not contain the flows even from a single day of filter press operations. This experiment was abandoned, because treating only a portion of the side stream would likely not provide any usable data.

6. From December 17 – 19, 2014, a pilot unit for PW Tech was brought in to determine its effectiveness for removal of solids and reducing the filtrate volume to address some of the issues involving the large volume and concentration of phosphorus in the filtrate. The results were better than anticipated, as the solids cake ranged from 16.8 to 30.6% and the solids capture had rates consistently around 96%. A copy of the pilot test report was just received in early June and a copy is attached for reference. Authority staff are continuing to evaluate the potential use of such a PW Tech unit.

7. The Authority staff or engineer have visited the following wastewater treatment plants in regard to phosphorus removal technologies:

a. Shippensburg Borough, Franklin County, PA Design flow – 4.3 MGD	5-Stage Bardonpho ENR process
b. Brodhead Creek Regional Authority, Monroe County, PA Design flow – 4.5 MGD	SBR with Chemical Filters Addition & Disk
c. Granville Township, Mifflin County, PA Design flow – 0.5 MGD	SBR with Chemical Addition
d. East Goshen Municipal Authority, Chester County, PA Design flow – 0.75 MGD	Disk Filters

Work Planned for the Next Six Months

1. The Engineer and Authority personnel will continue to locate and visit other treatment facilities with innovative phosphorus removal systems to evaluate such systems' potential applicability.

2. Authority personnel will continue to test, monitor, and record phosphorus levels at various locations in the plant to determine potential points in the treatment process where application of chemicals might be effective.

3. Authority personnel intend to continue to conduct additional tests to evaluate the impact of varying chemical feed dosage at various points in the treatment process.

4. Authority staff will continue evaluating various types of dewatering systems and phosphorus removal technology.